Figure 1: Overall Configuration of SoD Service System
with Direct Cabling between Host I/O Controllers and I/O Ports
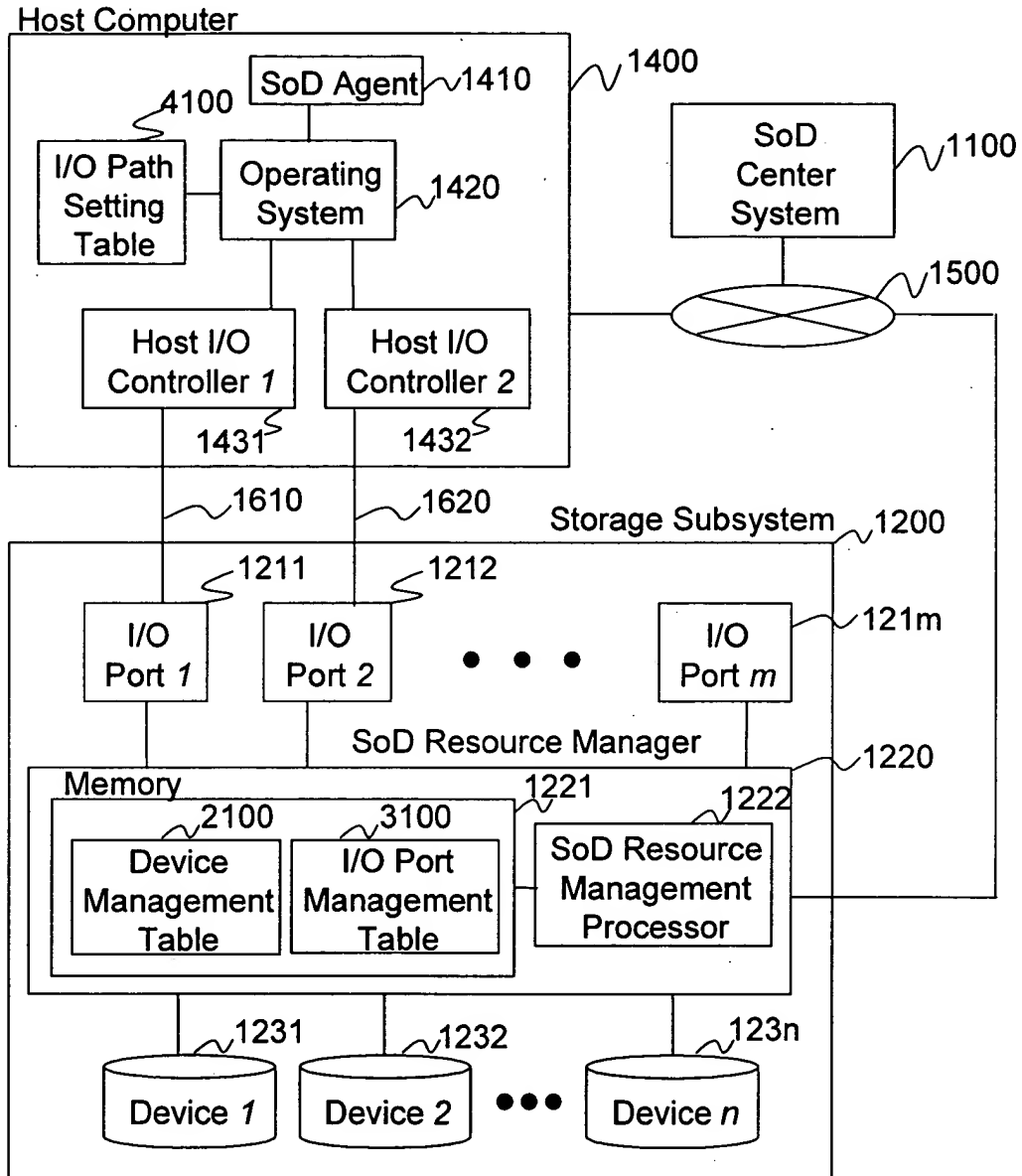
Host Computer

SoD Agent ~1410   ~1400

4100

I/O Path Setting Table

Operating System ~1420

SoD Center System ~1100

~1500

Host I/O Controller 1   Host I/O Controller 2

1431   1432

~1610   ~1620

Storage Subsystem ~1200

1211   1212

I/O Port 1   I/O Port 2   ● ● ●   I/O Port m   ~121m

SoD Resource Manager

Memory   1221   1222   ~1220

2100   3100

Device Management Table   I/O Port Management Table   SoD Resource Management Processor

~1231   ~1232   ~123n

Device 1   Device 2   ● ● ●   Device n

Figure 2: Device Management Table (Scenario 0)

Device No.	Installation Status	SoD Status	Size
1	Installed	Usable	500 GB
2	Installed	Usable	500 GB
3	Installed	Un-Usable	250 GB
4	Installed	Un-Usable	250 GB
5	Un-Installed	N/A	N/A

2101 2102 2103 2104 2100

n	Un-Installed	N/A	N/A

Figure 3: I/O Port Management Table (Scenario 0)

I/O Port No.	Installation Status	SoD Status	Device No.
1	Installed	Usable	1, 2
2	Installed	Un-Usable	Un-Allocated
3	Un-Installed	N/A	N/A

3101 3102 3103 3104 3100

m	Un-Installed	N/A	N/A

Figure 4: I/O Path Setting Table (Scenario 0)

I/O Path No.	Host I/O Controller No.	I/O Port No.
1	1	1
2	Un-Defined	N/A
3	Un-Defined	N/A

4101   4102   4103   4100

Figure 5: Processing Flow of SoD Center System

```
        ( START )
            |
            | 5001
  +-------------------+
  |  Input SoD Demand |
  +-------------------+
            |
            |
      < Can the Demand >  5002
 No <   Be Met?       >
  |         | Yes
  |      5005|    5003
+---------------------+  +-------------+
|Output Demand        |  | SoD Service |
|Rejection            |  +-------------+
+---------------------+         |
  |                             | 5004
  |   +-----------------------------------+
  |   | Output SoD Service Processing Result|
  |   +-----------------------------------+
  |                   |
  +------------------>|
              ( END )
```
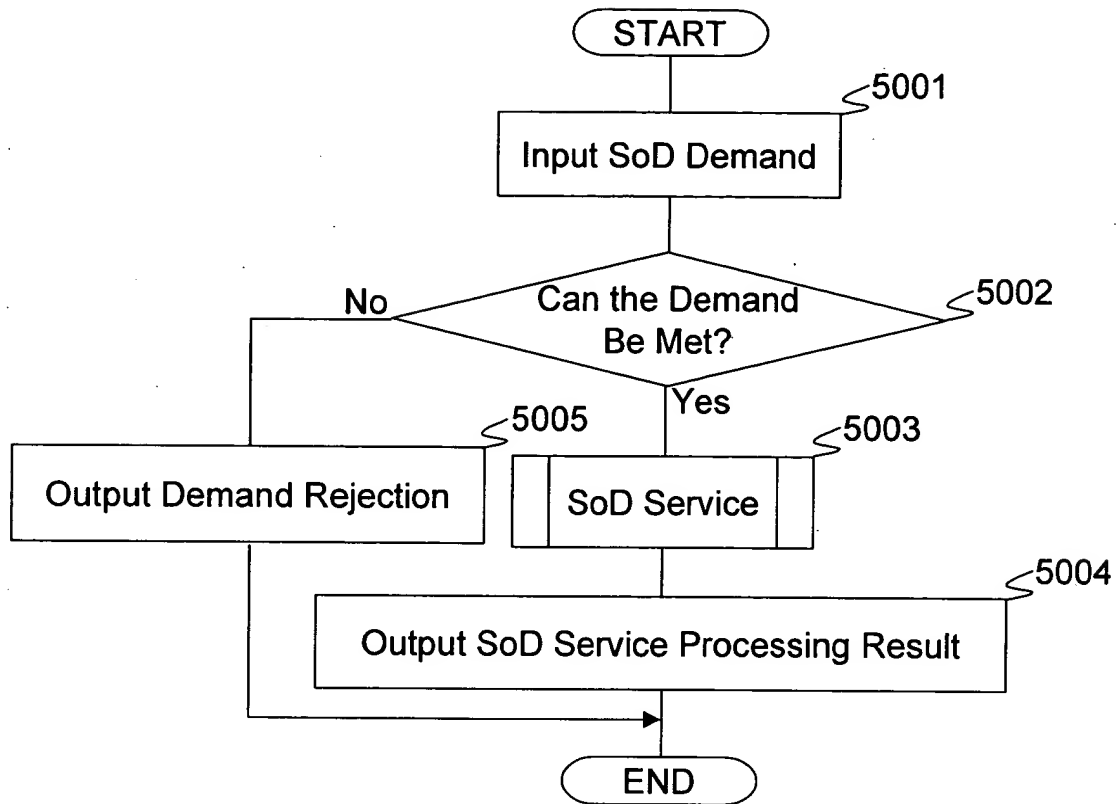
Figure 6: Processing Flow of SoD Service Module
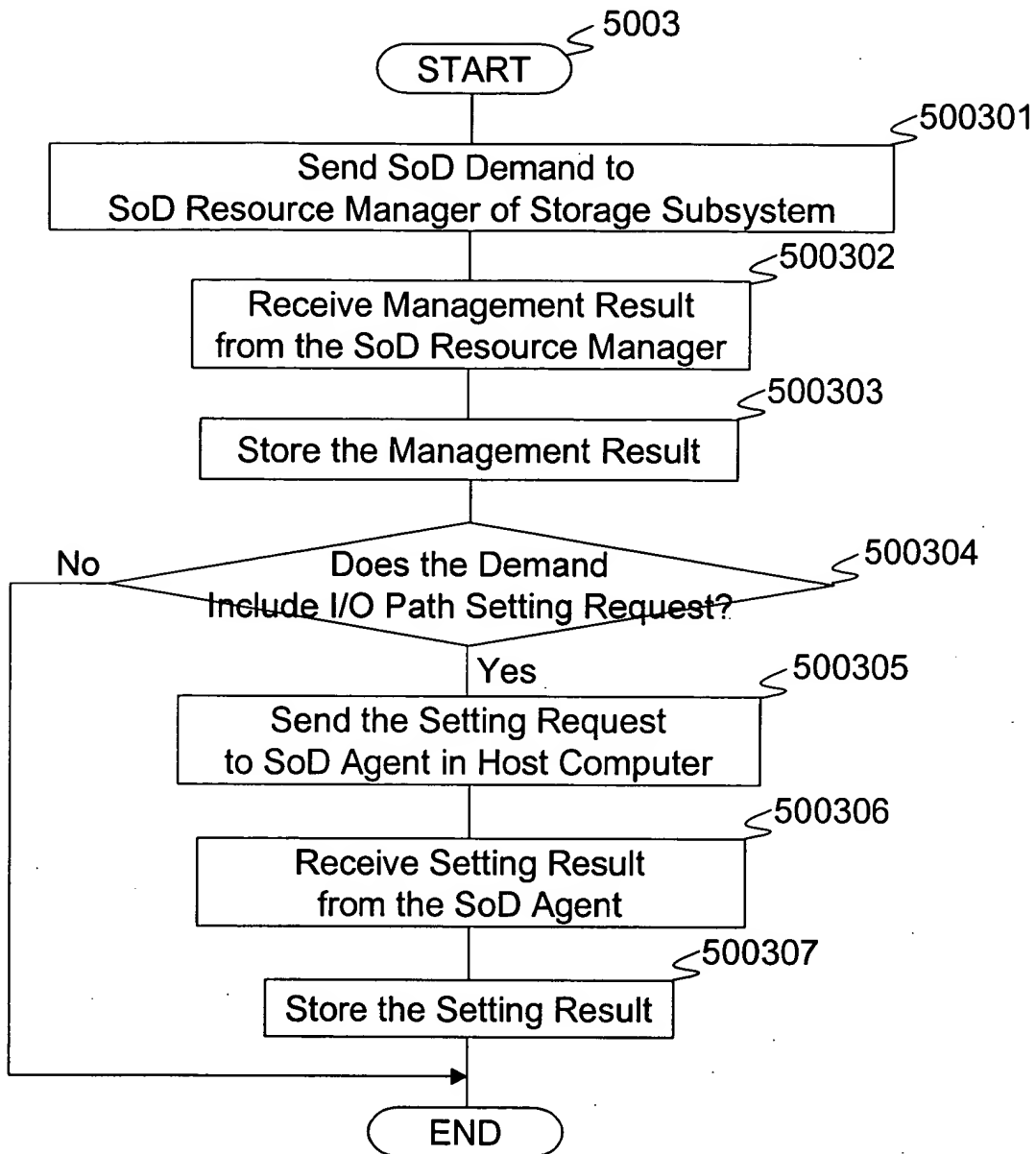
Figure 7: Processing Flow of SoD Resource Manager
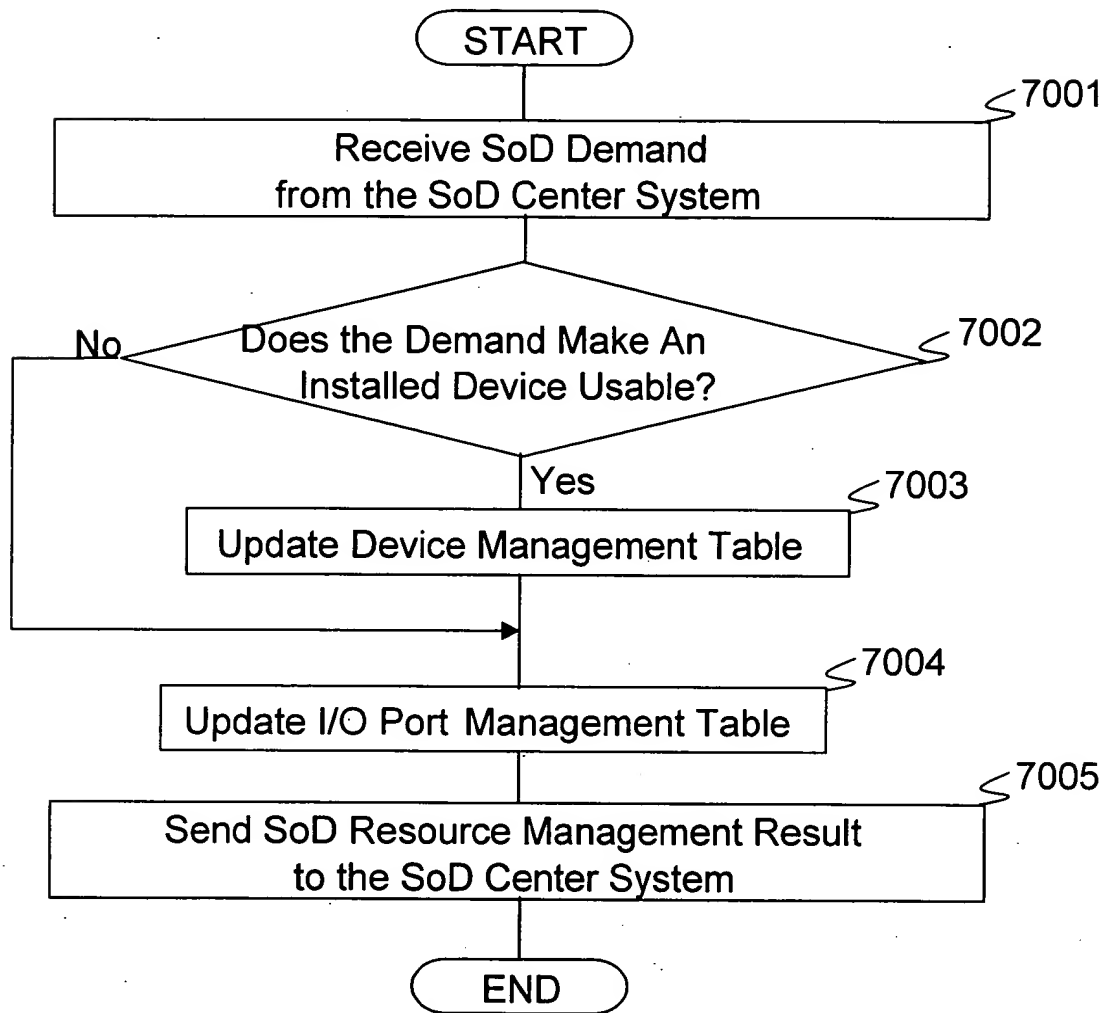(Updating Resource Management Tables)

```
                        ┌─────────────┐
                        │    START    │
                        └─────────────┘
                               │
                               │                           7001
        ┌──────────────────────────────────────────────┐
        │            Receive SoD Demand                 │
        │         from the SoD Center System            │
        └──────────────────────────────────────────────┘
                               │
                               │
        No          ◇ Does the Demand Make An ◇          7002
      ┌─────────────   Installed Device Usable?
      │                        │
      │                       Yes                        7003
      │         ┌──────────────────────────────────┐
      │         │   Update Device Management Table  │
      │         └──────────────────────────────────┘
      │                        │
      └───────────────────────►│
                               │                         7004
        ┌──────────────────────────────────────────┐
        │      Update I/O Port Management Table     │
        └──────────────────────────────────────────┘
                               │                         7005
        ┌──────────────────────────────────────────────┐
        │      Send SoD Resource Management Result       │
        │          to the SoD Center System             │
        └──────────────────────────────────────────────┘
                               │
                        ┌─────────────┐
                        │     END     │
                        └─────────────┘
```

Figure 8: Processing Flow of SoD Resource Manager
(Using Management Tables to Manage Resources)

START

Receive I/O Command to Use Storage Resources
from Host Computer
$\leftarrow$8001

Are All the Resources Usable?
(Checking Tables)
$\leftarrow$8002

No

Yes $\leftarrow$8003

Perform the I/O Command

8004$\leftarrow$

Reject the I/O Command

$\leftarrow$8005

Send I/O Result to the Host Computer

END
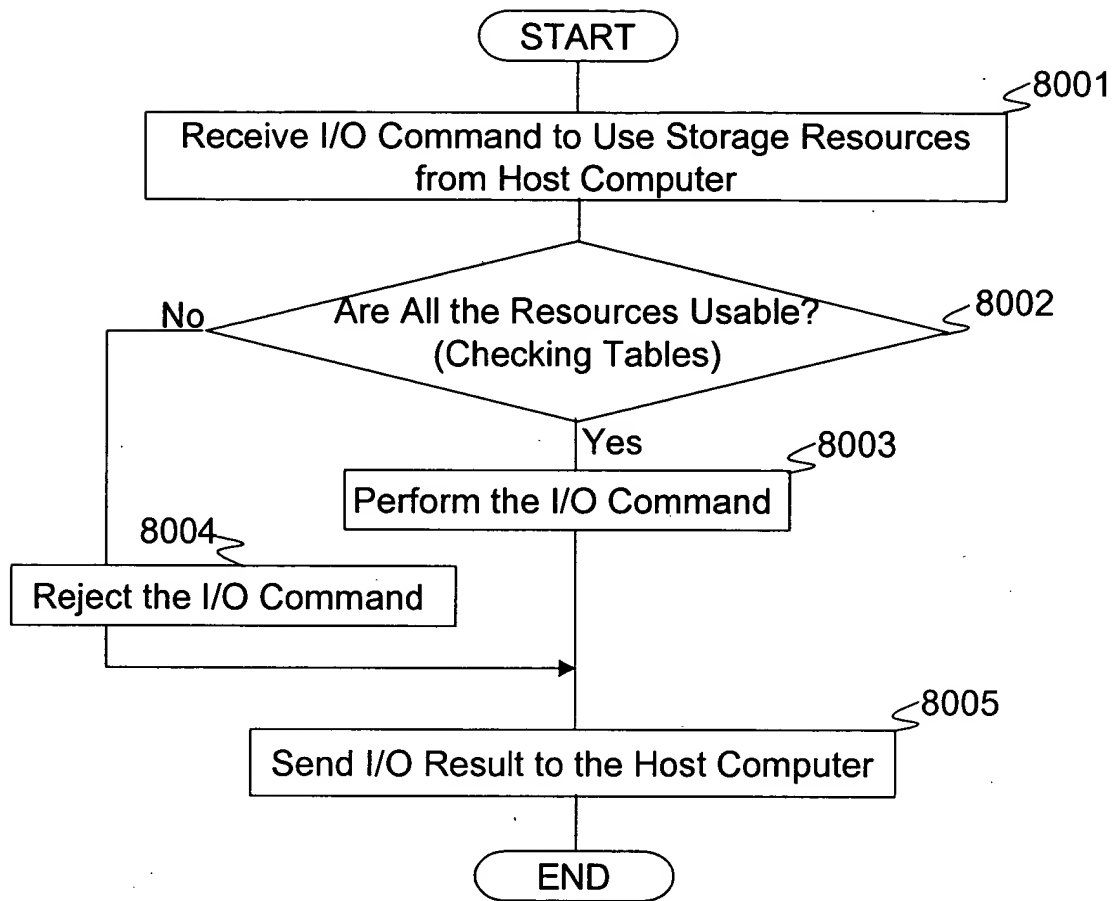
Figure 9: Processing Flow of SoD Agent

START

Receive I/O Path Setting Request
from the SoD Center System 9001

Ask Operating System
to Update I/O Path Setting Table
Based on the Request 9002

Get Update Result
from the Operating System 9003

Send I/O Path Setting Result
to the SoD Center System 9004

END
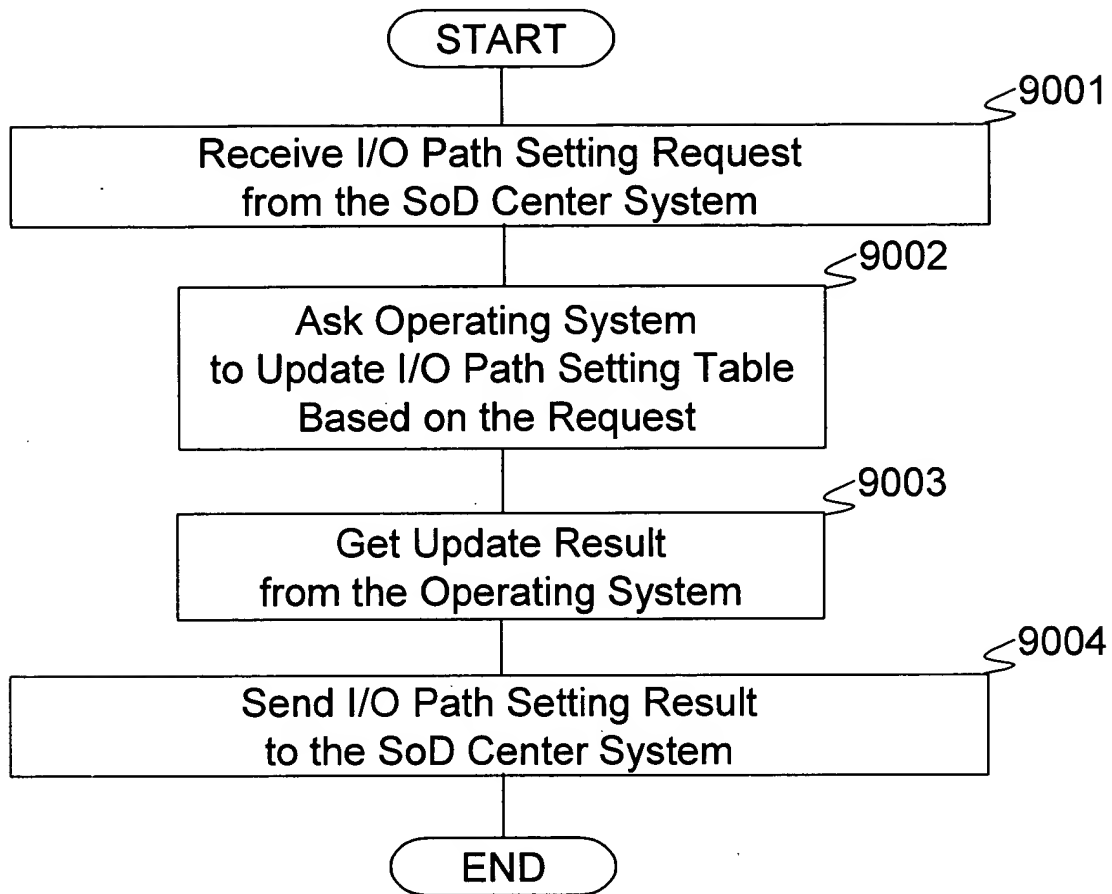
Figure 10: GUI of SoD Demand Input
(Scenario 0 → Scenario 1)

1000

1004

1002

1006

Host Computer

Connect any resources to make a new path!

Host I/O Controller 1

Host I/O Controller 2

I/O Path 1

[Legend]

Usable

Un-Usable or Not Installed

Storage Subsystem

I/O Port 1

I/O Port 2

· · ·

Click any resource to make it usable!

Device 1 (500GB)

Device 2 (500GB)

Device 3 (250GB)

Device 4 (250GB)

Device 5 (None)

· · ·

1010

Host Computer

Connect any resources to make a new path!

Host I/O Controller 1

Host I/O Controller 2

I/O Path 1

I/O Path 2

[Legend]

Usable

Un-Usable or Not Installed

Storage Subsystem

I/O Port 1

I/O Port 2

· · ·

1012

Click any resource to make it usable!

Device 1 (500GB)

Device 2 (500GB)

Device 3 (250GB)

Device 4 (250GB)

Device 5 (None)

· · ·

Figure 11: I/O Port Management Table
(Scenario 0 → Scenario 1)

I/O Port No.	Installation Status	SoD Status	Device No.
1	Installed	Usable	1, 2
2	Installed	Usable	1, 2
3	Un-Installed	N/A	N/A
⋮			
m	Un-Installed	N/A	N/A

3101　3102　3103　3104　3100

Figure 12: I/O Path Setting Table
(Scenario 0 → Scenario 1)

I/O Path No.	Host I/O Controller No.	I/O Port No.
1	1	1
2	2	2
3	Un-Defined	N/A
⋮		

4101　4102　4103　4100

Figure 13: GUI of SoD Demand Input
(Scenario 0 → Scenario 2)
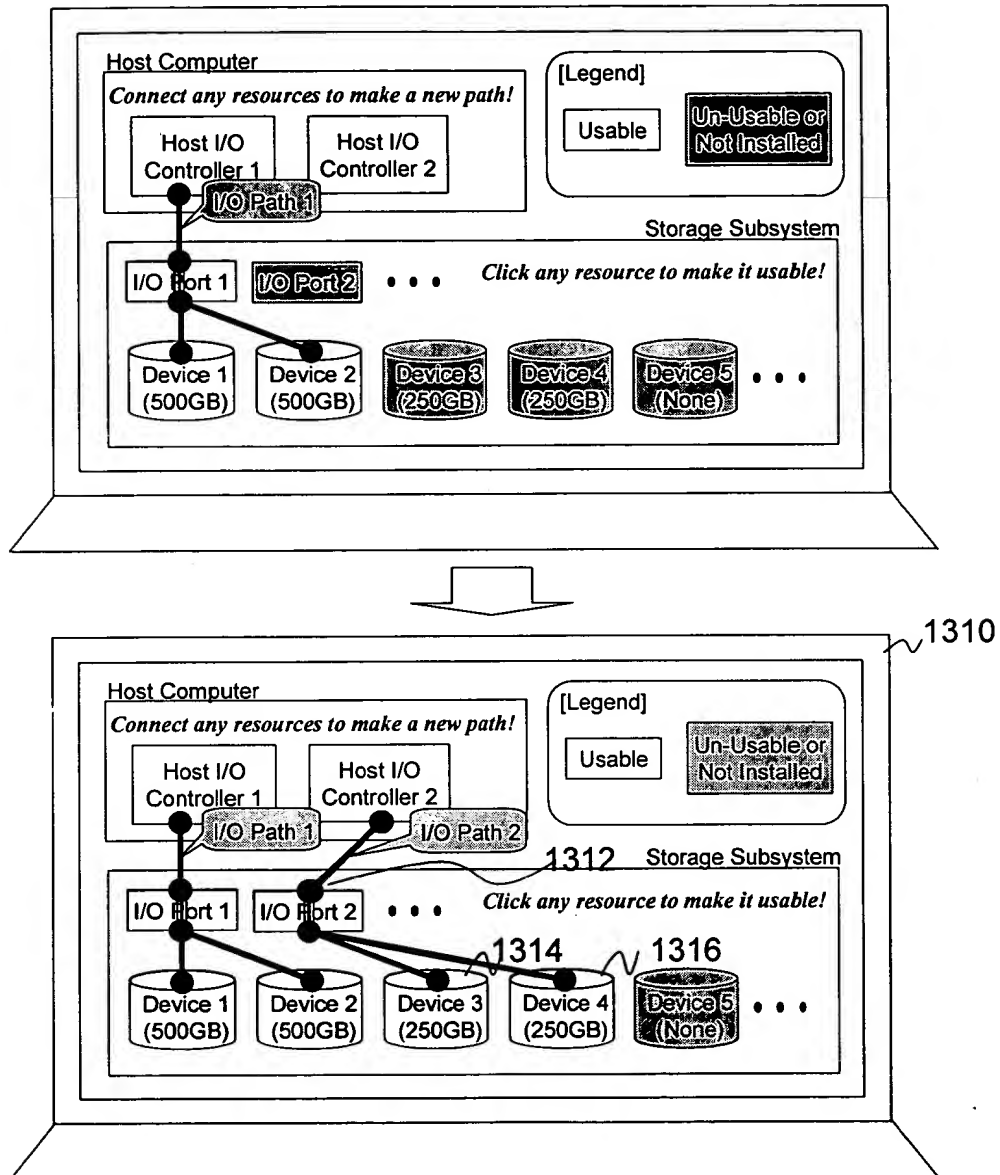
Figure 14: Device Management Table
(Scenario 0 → Scenario 2)

2101 2102 2103 2104 2100

Device No.	Installation Status	SoD Status	Size
1	Installed	Usable	500 GB
2	Installed	Usable	500 GB
3	Installed	Usable	250 GB
4	Installed	Usable	250 GB
5	Un-Installed	N/A	N/A
n	Un-Installed	N/A	N/A

Figure 15: I/O Port Management Table
(Scenario 0 → Scenario 2)

3101 3102 3103 3104 3100

I/O Port No.	Installation Status	SoD Status	Device No.
1	Installed	Usable	1, 2
2	Installed	Usable	3, 4
3	Un-Installed	N/A	N/A
m	Un-Installed	N/A	N/A

Figure 16: I/O Path Setting Table
(Scenario 0 → Scenario 2)

4101   4102   4103   4100

I/O Path No.	Host I/O Controller No.	I/O Port No.
1	1	1
2	2	2
3	Un-Defined	N/A

•
•
•

Figure 17: Overall Configuration of SoD Service System with FC Switch between Host Computers and Storage Subsystems